D SERIES COLOUR TELEVISION

PAL, SECAM

SYSTEMS I, BG, DK, LL'

SERVICE INFORMATION

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1. SAFETY AND ISOLATION

Under no circumstances should any form of repair or maintenance be attempted by any person other than a competent technician or engineer. Most of the circuitry on the chassis is isolated from the a.c. supply by T801, C827, R813 and R824 and 6mm air gaps. To maintain this safety factor ensure that, after repair, any gaps or leakage paths are not reduced by protruding wires, etc., following component replacement.

NOTE: although the output supply paths from the power supply section are isolated from the incoming a.c. supply, the bridge rectifier and the control and regulation circuits are not isolated. Therefore, when servicing the power supply section of the chassis, the a.c. supply should be connected via an isolating transformer of at least 200 watts rating.

The power supply section remains charged with respect to chassis for 30-60 seconds after switching off. Care should be taken to avoid touching the power supply area of the chassis during this time.

Components marked ⚠ on the parts list are safety approved types and should be replaced only with components supplied or approved by our Service Department. It is also recommended that components not marked with the safety symbol should be replaced with parts of the type originally fitted. This applies particularly to those resistors which are stood off the printed circuit boards.

1.1 Handling Precautions - Static Electrical Charges

The receiver contains devices which may be damaged by static electrical charges during handling. To avoid damage, soldering irons should be earthed, and service personnel should wear wrist straps earthed via a 1M ohm resistor. If the latter is not practical, they should discharge themselves by touching an earthed point. Sensitive static devices should be packed in suitable conductive containers.

IMPORTANT: although the receiver chassis is isolated, the a.c. supply should be disconnected during service replacement of such static devices.

2. SWITCHED MODE POWER SUPPLY

The self-oscillating switching converter circuit centres around IC801 (TDA4605) which provides all the necessary control and protection functions. The operating frequency varies in the range 20-80kHz dependent upon the load conditions. IC801 controls the MOS power transistor (Q801) which switches T801 primary winding across the rectified a.c. supply voltage stored in the reservoir capacitor (C808). AC output voltages of 9.5V, 18V and 109.5-115V, developed at taps on the secondary winding, are rectified and smoothed by separate diode/capacitor networks.

The Q801 drive from pin 5 of IC801 maintains constant secondary winding voltages regardless of input or load changes. A control voltage, derived from a secondary winding, is rectified/smoothed by D808/CE806. The attenuated control voltage is applied to IC801 pin 1 and is used to match pin 5 output pulse frequency to secondary load conditions. RV806 (SET HT) adjusts the proportion of the control voltage fed to pin 1 of IC801 and thereby adjusts the output voltage. R811 and C807 provide pin 2 of IC801 with a voltage proportional to Q801 drain current. This is used in the IC to control the pulse duty factor at pin 5. The AC control voltage from T801 secondary is attenuated by R805 and fed to pin 8 of IC801 to ensure correctly timed drive pulses for Q801. The zero passage detector at pin 8 senses a zero crossing and thereby enables the control logic. The supply to pin 6 of IC801 is developed by D807 and C803 from the secondary winding of T801. Start-up voltage is provided via R802 and R803 from a "half-wave" point on the a.c. supply rectifier bridge.

IMPORTANT: Pin 4 is approximately -340V relative to the chassis.

2.1 H.T. Adjustment

With the receiver locked to a normal picture signal, reduce the brightness, contrast and A1 controls to minimum for zero beam current. Connect a suitable voltmeter across CE415 and adjust RV806 for a reading of 115V (14", 20" and 21" narrow neck models), or 109.5V (15" and 21" FST mini-neck models).

2.2 Secondary circuits

The secondary windings of T801 are half-wave rectified to provide the various supply rails required for the chassis.

The +12V supply is regulated by IC803, and associated components. TR802 is controlled by the microcontroller (IC702) to disable the +12V supply when standby mode is selected. The +8V supply is derived from the +12V supply rail by TR803 and ZD815. The +5V supply is derived from a dedicated winding of the transformer T801 by IC802.

2.3 HT supply (109.5V/115V)

Regulation of the HT supply is provided by the action of the power-supply control device (IC801) and optimized by adjustment of RV806. The remaining secondary voltages will alter in sympathy with the HT supply, hence regulators are used to maintain the correct low voltage supplies.

3. TUNER AND I.F. STAGES

3.1 Tuner

The main chassis is fitted with TU001, either a UHF tuner for system I or a UHF/VHF tuner for systems B,G,D,K,L & L'. Tuning is achieved by varying the d.c. control voltage at pin 7 of TU001. The microcontroller varies the PWM circuit around TR004 to generate the tuning voltage required. A stable +33V supply is provided by a temperature compensated regulator, IC001, which is driven from the HT supply.

The AFC is sampled by the microcontroller and frequency correction is achieved by (microcontroller) adjustment of the tuning voltage. There is no direct connection of the AFC output from the I.F. to the tuner.

For most aerial input signal levels the tuner operates at full gain. At high signal levels the gain of the tuner is reduced by an AGC voltage generated in the I.F. stage. The AGC output from the I.F. (IC503 pin 47) is applied to pin 1 of the tuner TU001.

On multi-band receivers band selection is achieved by switching one of tuner pins 3, 4 or 6 to 12V, controlled from the microcontroller via TR701- 703 and TR001-003. Link LK002 is fitted for single band UHF receivers.

3.2 AGC and AFC adjustments

Correctly tune the receiver to a 10mV R.F. modulated carrier on channel E 58 (767.25MHz). Monitor the tuner output (TU001 pin 13) with an oscilloscope and probe calibrated to read accurately at 40MHz. Adjust RV014 to obtain the following level at the peak to peak sync excursions:-

UHF models 1.2V, UHF/VHF models 600mV

The tuner may have a differential output (TU001 pins 12 & 13) or single-ended output (pin 13). For the former, measure for half the stated signal level at each pin with respect to ground.

The AFC is adjusted with tank coil L003 to obtain 2.0V across R716, when a 38.9MHz signal is injected into pin 1 of the SAW filter FL001. There are two slopes which pass through this point; adjust to the steepest, and check the TV holds its tuning over the whole range on all bands.

3.3 Vision and sound decoding

The majority of the vision and sound decoding, deflection and colour decoding is performed by IC501.

The I.F. signal passes from the tuner through the SAW Filter FL001, to filter unwanted frequencies, to IC503, pins 45 and 46. It is demodulated internally and the output at pin 7 is buffered by TR501. The sound and vision components are now separated; FL604-606 remove the sound component from the vision and FL602,603 filter the FM sound carrier which is then applied to pin 5 (different combinations of filters are fitted depending on which standards the chassis receives). Video is then fed to the SCART socket output, SK502 pin 19.

Pin 1 of IC503 has an external de-emphasis capacitor C612, and has non-volume controlled audio present (350mV RMS). This is fed back to the internal volume control and out from pin 50 to the audio amplifier IC 602. It is also fed to pin 1 of the three channel analogue switch IC603, via buffer TR602.

3.4 French System L with AM sound

The modulation is positive for system L transmissions. This is not detected by IC503, but selected by the user from the tuning menu. The microcontroller will attempt to identify the correct transmission standard while search tuning, if it detects a station is tuned but not synchronized then it will invert the polarity of the demodulated video. This system will fail if the incorrect polarity provides a synchronized picture e.g. colour bars.

When a dc level of 8V is applied to pin 1 of IC503 by TR601, the IC inverts the modulation and selects external audio input. The AM sound is decoded by IC601, fed from the switchable sound SAW filter FL601. The output, pin 6, goes to pins 2 & 3 of analogue switch IC603. This connects the AM audio to the external audio input pin 6 of IC503 and the SCART audio output through TR603.

On band I, system L has the sound and vision carriers transposed. To handle the audio sub-carrier difference, the AM audio SAW filter FL601 has two inputs, with pass bands for L and L'. The differential IF signal is fed to L' input pin 7 and L input pin 4. The other inputs (pins 5 & 6) are linked to form a centre tap on the filter.

When pin 10 of the microcontroller is at 0V, TR705 is off and the centre tap is pulled up to 12V via R017, L601 & R601. D601 is reverse biassed, having 12V at the cathode and 8V via R602 at the anode. The level of reverse bias ensures very little capacitive effect on the circuit. D602 conducts, with 12V at the anode and approximately 4V (provided from 12V by R603 & R630) at the cathode. D602 therefore shorts the L filter, pins 4 & 5, and the signal at the anode of D601 passes through the L' filter, pins 6 & 7, coming from pin 13 of the tuner.

When pin 10 of the microcontroller is at 5V, TR705 conducts and the centre tap is at 0V. Now D602 is reverse biassed by the 4V at its cathode, and D601 conducts, thus the L' filter is shorted and the L filter takes the signal from pin 12 of the tuner at the cathode of D602.

The shift of the video carrier is handled by a fixed shift of L003. The line from TR705 causes D003 to conduct for L', switching C010 in parallel with the tank coil and causing a frequency shift from 38.9MHz to 34.5MHz.

4. SOURCE SELECTION

Source selection is controlled by microcontroller lines A (IC702 pin 11) and B (IC702 pin 17). These control the DC level on IC503 pin 16 (chroma), which is low for internal source selection, high for external AV and half supply for chroma input (SVHS). Pin 21 controls RGB insertion; 0V for internal RGB, over 0.9V for external RGB from pins 22, 23 & 24, and over 4.5V to blank the RGB outputs for on-screen display insertion after IC503's outputs.

4.1 RF source

Control lines A and B are both high. 0V DC levels are present on pins 16 and 21 of IC503. TR605 is off so the X and Z control inputs of IC603 are held high by R616. The Z channel selects AM sound to IC503 external audio input (when applicable) and the X channel routes broadcast video from R548/R549 to pin 8 of teletext controller IC301 (when fitted).

4.2 AV input

Control line A is low and B is high. Pins 16 and 21 of IC501 are at 8V and 0V respectively. TR605 is on so the X and Z control inputs of analogue switch IC603 are held low. The Z channel selects external audio and the X channel routes external video to the teletext IC.

4.3 SVHS input

Line A is high and B is low. Pin 16 of IC503 is now controlled by TR503, so R524 and R525 put it at 4V. IC503 therefore selects luma/chroma input for SVHS and external audio and text inputs are selected as for AV.

4.4 RGB input

Both control lines are low. Pin 16 is at 8V DC, and RGB is selected by 4V at pin 21. External audio and text are selected as for AV.

5. COLOUR DECODER

The luma signal processing and colour decoding are also implemented by IC503. The luminance and chrominance signals are separated internally. A delay line is also incorporated to compensate for the difference between the luma and chroma processing times.

The chrominance signal is demodulated and the two colour difference components are fed through IC502, a 64µs charge-coupled delay line.

Contrast, brightness and saturation are controlled by IC503. The analogue outputs from the microcontroller, pins 2, 3 and 4 are biassed by R530-R535 (when fitted) and fed to pins 17, 26 and 25 of IC503. The microcontroller controls the d.c. levels of the analogue outputs when picture adjustments are made by the user.

The contrast control is also used to control the beam limit. When the beam current approaches 0.8mA the voltage across R420 falls to below the voltage at pin 25 IC503 and current flows through R428, R536 and D502 reducing the contrast voltage and limiting the drive to the tube.

There are no adjustments required on the colour decoder.

5.1 SECAM models

On models designed to receive PAL and SECAM colour transmissions extra components are fitted; indicated by a circled letter C on the circuit diagram. IC501 is the SECAM demodulator which takes the sub-carrier input and produces the R-Y and B-Y colour difference signals. The d.c. voltage on these lines determines whether the signals are fed from IC501 or IC502 to pins 28 & 29 of IC503.

5.2 On-screen & text displays

Both the microcontroller on-screen display and the teletext IC (when fitted) supply blanking and RGB signals for overlaying the TV picture.

Text and on-screen display RGB and blanking signals from IC702 pins 22-25 and IC301 pins 15-17 and 19 are combined by diodes D301-D304, D707 and D715-D717. D306-D308 use the RGB teletext outputs to strengthen the blanking output.

The comparators of IC302 adjust the blanking up to 8V to drive the fast blanking input of IC503, and shift the RGB drives.

Blanking is carried out by TR304 which raises the RGB pin 21 of IC503 to 8V when on. Red, green and blue insertion is by TR301, TR302 and TR303 respectively, supplying current to the tube drives when on and having high impedance when off.

Teletext contrast follows the TV contrast, except for the packet 830 message when changing to a text channel. When in TV mode, pin 21 of IC301 is low, so TR307 is off and TR306 is on, biassing the bases of TR301-TR303 from 5V. When in text mode pin 21 goes high, turning TR307 on and TR306 off. The bias for the bases of TR301-303 is now from TR305, which is controlled by the microcontroller's contrast control voltage, from pin 4 of IC702.

6. SYNC PROCESSING AND TIME BASE GENERATORS

In addition to decoding and switching, IC503 provides deflection processing for the horizontal and vertical time base circuits. Using video from the IF or external source as appropriate, the time base section of IC503 produces horizontal drive pulses at pin 37 to switch horizontal drive transistors TR401 and TR402, and a vertical ramp voltage at pin 43 to drive the vertical output circuit (IC401), with a reference waveform at pin 42. The system uses a three level sandcastle pulse (at IC503 pin38) to control horizontal and vertical blanking and colour burst gating, 1.0V, 2.5V and >3V respectively.

6.1 Horizontal Time base

The horizontal time base is controlled in IC503 by a dual PLL referenced to the 4.433MHz crystal oscillator. Feedback is obtained from the sandcastle pulse generated at pin 38. Horizontal phase adjustment is achieved by adding a fixed phase offset at pin 39 via RV537. There is no horizontal frequency oscillator adjustment on this television.

6.2 Vertical time base

A ramp is generated at pin 42 of IC503 by the charging of C507 with a simulated current source from high value resistor R504. This is compared with the current feedback from the vertical deflection at pin 41 to produce a drive waveform at pin 43. The waveform at pin 43 is then fed to IC401 which amplifies it to drive the vertical deflection coils.

7. HORIZONTAL SCAN AND EHT

Horizontal deflection pulses from IC503 are fed to the base of TR401 which with TR402 in Darlington configuration forms the horizontal drive. The vertical drive transformer (T401) secondary provides a low-impedance pulse source to switch the horizontal output transistor TR403. The horizontal scan output circuit is a conventional energy recovery type with the horizontal deflection coils tuned during flyback by C414. 'S' correction is provided by C417.

A 26V supply for the vertical deflection is taken from a secondary winding on the diode-split transformer (T402). This is rectified by D402 and smoothed by CE408.

A further secondary winding provides power for the picture tube heaters and a reference flyback pulse for IC503. Output from a tap on the primary winding, rectified by D403 and smoothed by CE409, provides a 200V supply for the video output amplifiers on the tube-base panel.

The EHT supply to the picture tube (24kV nominal) is produced within the diode-split transformer (T402) by a 3-stage diode split overwind. The leakage inductance of T402 and the distributed capacitance of its overwind are tuned to harmonics of the horizontal flyback frequency to ensure good EHT regulation. An integral thick-film resistor network is connected across the first section of the overwind to provide adjustable focus and A1 voltages for the picture tube.

Linearity and width may be adjusted by L407 on some models, on others it is fixed and width only is adjusted by L408.

8. VERTICAL SCAN

Vertical scan is carried out by IC401 using a 26V supply derived from the horizontal scan output circuit. The vertical drive ramp present on pin 43 of IC503 is fed via resistors to pins 1 and 3 of IC401. The scan current output at pin 5 of IC401 is fed to the vertical scan coils. The current in the coils is sampled by R410 with the resulting voltage fed back to pin 41 of IC503.

For rapid flyback, IC401 is equipped with a flyback generator. The 26V supply to IC401 during scan is applied to pin 6 via D401. During flyback the voltage is transferred through CE401 to pin 8 causing the voltage to double. This results in a more rapid collapse of the scan coil current until the voltage across the coils falls below 26V when pin 8 swings back to low voltage and the cycle is repeated.

Adjust height with RV407, and vertical shift with RV426.

9. TUBE BASE PANEL

The picture tube-base panel includes the supplies to the tube electrodes and the video amplifiers. The tube-base socket has integral spark gaps. Focus and A1 supplies are connected direct from the flying leads of T402.

The cascode video amplifiers are based around TR910/911 for red, TR920/921 for blue and TR930/931 for green. To adjust the red, green and blue backgrounds, adjust the user brightness and contrast controls to their normalized settings and set the colour saturation control to minimum. Adjust each of the background controls R917, R927 and R937 so the black level measured at each tube cathode (R916, R926, and R936) is 150V for 14" tubes or 160V for other tubes.

Increase the A1 control for correct overall black level on the display. Grey-scale corrections should now be carried out with only two of the background preset controls.

10. REMOTE CONTROL

The remote control system used is the RC5 protocol, with sub-address 00000 and the command codes as allocated for CTV use.

10.1 Infra-red transmitter

The hand unit transmission is controlled by IC781, which scans the membrane keypad and generates the drive for the infra-red emitting diode D781.

When no key is pressed, IC781 remains in low-current standby mode with the resonator inactive. When a key is pressed the IC is activated and the oscillator starts.

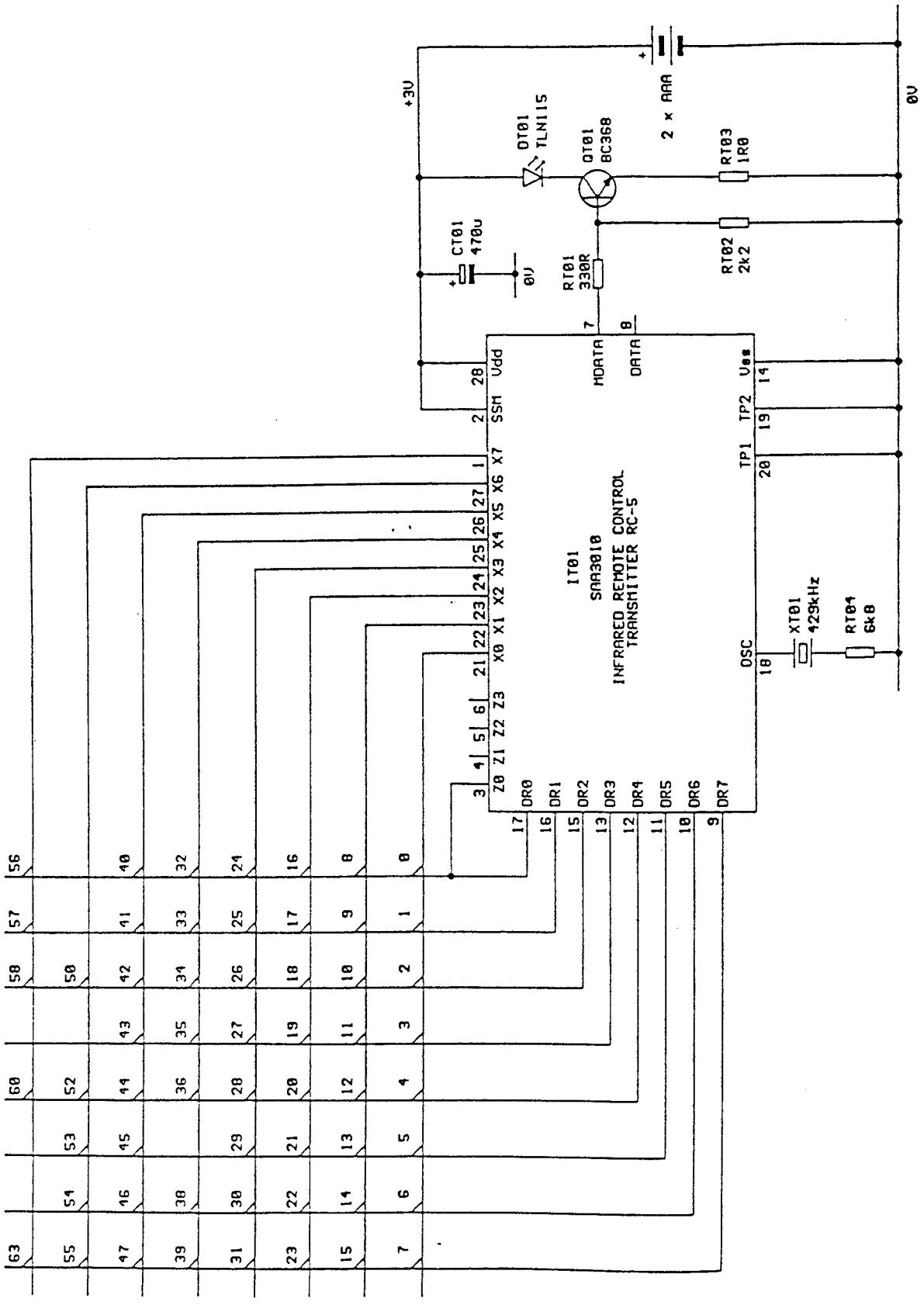
The 429kHz ceramic oscillator provides all the timings for the IC including duration of the encoded remote control pulses and generation of the 35.75kHz carrier (divide by 12) which modulates them.

The IC generates the relevant code, and modulates the pulse train onto the carrier, which saves power and allows a higher momentary LED current. The resulting output at pin 7 drives transistor TR781 which pulses a high current through D781 / R783 providing a good transmission range. C781 reduces battery voltage drop which may otherwise affect the IC operation.

10.2 Infra-red receiver

The hand unit transmissions are received, amplified and demodulated by IC701, which produces a pulse-stretched digital output fed straight to the microcontroller where it is decoded by the software.

10.4 FXD Remote Control Circuit Diagram



11. MICROPROCESSOR CONTROL SYSTEM

The operation of the television is controlled by the microcontroller IC701 this controls the following functions:

The tuning, via a 14 bit pulse-width modulated (PWM) tuning output (pin 1), which switches TR004 on and off, chopping the +33V supply through R001 into a rectangular waveform on TR004 collector. This waveform is smoothed by the network of R003/C004/R004/C005. The total possible change in the tuning voltage output at TU001 pin 7 is 0.0V to 31.0V. Further smoothing close to the tuner is provided by R005/C006. The PWM settings for each channel are stored in non-volatile memory IC703. When a programme is selected the stored PWM value is output from the microcontroller. The microcontroller then checks to see if a front end (IF) ident signal is present at pin 13, indicating that a valid signal has been found, the PWM value is then fine tuned by monitoring the AFC input pin 9 (a voltage greater than 2.0V indicates too high in frequency and less than 2.0V indicates too low). The microcontroller will always adjust the tuning until pin 9 is at 2.0V even if the AFC/Tank coil L003 is incorrectly adjusted, (unless the AFC is defeated or there is no valid signal present). On UHF/VHF models the frequency band selection is performed by TR701-3 and TR001-3 which apply 12V to the appropriate pin of TU001.

The analogue picture controls are controlled by DAC's (pins 2-4) these are fed through resistor networks, to limit the range, directly to IC503. The contrast control pin 4 is also used to limit the beam current.

The volume is controlled by a DAC (pin 5), which has its range limited by R623 and R624, and is then fed into pin5 of IC503. Volume muting is accomplished by reducing the volume to a minimum. When this happens TR606 & TR607 provide a hardware mute for the audio power amplifier IC602; this also prevents thumps from the speaker at switch on and off. The audio is muted on channel change or when there is no signal by detecting the lack of back end (deflection) ident, pin 14. The scart audio out is muted by TR604 whenever there is no front end (IF) ident.

The local keyscan (pins 38-41) and remote control input (pin 34) lines are monitored by the microcontroller. Every time a key is pressed or an infra red command is detected the LED is illuminated for approximately 500ms.

At switch on the microcontroller is reset by the voltage at pin 33 being held low by CE702 this then charges up to allow the micro to operate normally.

The microcontroller has two clocks: XL701 (which is either a 4MHz crystal or a 4MHz ceramic resonator, depending on the model) provides the main cpu clock and is the reference for the tuning and the real-time clock on non text models; L702, C709 & C710 provide a 6MHz oscillator for the OSD which is reset every line by the HD input, pin 26. The microcontroller uses vertical and horizontal sync inputs (pins 26 & 27) to position the OSD on the screen.

12. INITIALIZATION

When a new NVRAM is fitted the default values must be re-loaded. This is accomplished by connecting together pins 1 & 2 of PL701 and pressing one of the local controls (S701). After a few seconds the television will go into standby to confirm that the defaults have been loaded. Remove the connection from pins 1&2. The television is now ready for use. This procedure will also re-load the factory default tuning values into the NVRAM as below:-

Prog	Channel(Approx)	Frequency(MHz Approx)
1	62	799
2	55	551
3	37	599
4	21	471
5	68	847
6	FC	48
7	09	205
9	31	767
64	RGB	

Also the current programme number is set to 1.

NOTE: With a Voltage Synthesis system the microcontroller cannot itself determine exactly the correct tuning voltage required to tune a particular signal. For this reason the default tuning values are calculated to set the tuning voltage below that required for the 'worst case' combination of component tolerances in the tuner and other tuning system components. This ensures that once the default values have been stored the appropriate channel (as shown above) can always be found by tuning 'up' the band rather than 'down' the band.

SECTION 13 COMPONENTS LIST

Components marked ⚠ are safety critical approved types and ***must*** be replaced with components supplied by Tatung Service Department. All other parts should be replaced with components of the same type and rating as those originally fitted.

The majority of resistors are either 0.125W, 0.25W, 0.4W or 0.5W standard carbon film or metal film types which are readily available from component stockists. Replacements should be of the same tolerance and rating as the originals. Refer to the circuit diagram for values.

The components listed below are ***not common*** to all models. Use the following legend to identify which models they appear on:

	Model No.	Chassis Type.		Model No.	Chassis Type.
a,	T21TD50	D4W	h,	D20TDE5	D2W
b,	T14RD50	D1	j,	D21TDB5	D4W
c,	T14RD50W	D1	k,	VU3DC3	D4W
d,	V14TDE0	D1W	l,	G55TD50	D4GW
e,	GT2D30	D2GV	m,	F55RD50	D4FV
f,	DT7D30	D2W	n,	V21RDE0	D4W
g,	T20TD50	D2W	p,	F37RD50	D1FV

Resistors

Cct Ref, Val, Tol, Watts, Type,	Models used on,	Part No.
R012,013, 4K7, 5%, 0.125W, CF,	m.p	11-5231-9
R017, 1K, 5%, 0.125W, CF,	m,p	11-5213-0
R301, 3K3, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5229-7
R302, 27K, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5288-2
R303, 5K6, 5%, 0.125W, CF,	a,d,f,g,h,j,k,l	11-5215-7
R316, 1K, 5%, 0.125W. CF,	a,d,f,g,h,j,k,l	11-5213-0
R317-319, 3K3, 5%, 0.125W,	a,d,f,g,h,j,k,l	11-5229-7
R321, 18K, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5246-7
R322, 5K6, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5215-7
R323, 10K, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5232-7
R324, 5K6, 5%, 0.125W, CF,	a,d,f,g,h,j,k,l	11-5215-7
⚠R414, 10R, 5%, 0.5W, MF Fl Ret,	b,c,d,e,f,g,h,p	11-5292-0
⚠R414, 0R68, 5%, 0.5W, MF Fl Ret,	a,j,k,l,m,n	11-5294-7
R420, 150K, 5%, 0.4W, MF,	a,e,f,g,h,j,k	11-5198-3
R420, 270K, 5%, 0.4W, MF,	b,c,d,p	11-5694-2
R437, 10K, 5%, 0.125W, SF,	a,d,f,g,h,j,k,l	11-5232-7
R516,517, 75R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5387-0
R518, 5K6, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5215-7
R519, 470R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5226-2
R520,521, 75R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5387-0
R524,525, 1K8, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5254-8
R526-528, 100R, 5%, 0.125W, SF,	a,b,c,d,f,g,h,j,k,n	11-5290-4
R538, 75R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5387-0
R539, 82R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5240-8
R542, 1K, 5%, 0.125W, CF,	l,n	11-5213-0
R543, 22K, 5%, 0.125W, SF,	m,p	11-5230-0
R548, 470R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5226-2
R549, 100K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5221-1
R550, 2K2, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5273-4
R552, 100K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5221-1
R601, 100R, 5%, 0.125W, SF,	m,p	11-5290-4
R602, 6K8, 5%, 0.125W, SF,	m,p	11-5256-4
R603, 15K, 5%, 0.25W, CF,	m,p	11-2788-8
⚠R604, 1R8, 5%, 0.5W, Fusing	m,p	11-5377-3
R609, 22K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5230-0
R610, 1K, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5213-0
R611,616, 10K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5232-7
R612, 270R, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5323-4
R613,617, 100K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5221-1
R614,615, 82R, 5%, 0.25W, CF,	a,d,e,f,g,h,j,k,l,m	11-3397-7
R618,619, 220R, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5214-9

Cct Ref, Val, Tol, Watts, Type,	Models used on,	Part No.
R625, 1K, 5%, 0.125W, CF,	m,p	11-5213-0
R626, 2K2, 5%, 0.125W, CF,	m,p	11-5273-4
R627, 6K8, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5256-4
R628,629, 39K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l	11-5275-0
R628,629, 22K, 5%, 0.125W, SF,	m,p	11-5230-0
R630, 8K2, 5%, 0.25W, CF,	m,p	11-3170-2
R631, 100K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5221-1
R709-712, 1K, 5%, 0.125W, CF,	b,c,e,m,n,p	11-5213-0
R713, 4K7, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5231-9
R714, 22K, 5%, 0.125W, SF,	a,d,e,f,g,h,j,k,l,m	11-5230-0
R725, 22K, 5%, 0.125W, SF,	e,l,m,p	11-5230-0
R726, 22K, 5%, 0.125W, SF,	e,l,m,p	11-5230-0
R727, 22K, 5%, 0.125W, SF,	e,l,m,p	11-5230-0
R731, 8K2, 5%, 0.125W, CF,	a,d,e,f,g,h,j,k,l,m	11-5428-1
R911,919, R921,929, R931,939, 2K7, 2%, 0.4W, MF,	b,c,d,p	11-3340-3
R911,919, R921,929, R931,939, 1K8, 2%, 0.4W, MF,	a,e,f,g,h,j,k,	11-3722-0

Capacitors

The majority of capacitors used are standard off-the-shelf items. Refer to the circuit diagram for values. Replacements must be of the same tolerance and rating as the originals.

Key to Type Codes:

Metalized Polyester - MP, Polypropylene - PP, Polyester - P, Metalized Polypropylene - MPP, Ceramic Plate - C, Polystyrene - PS, Electrolytic - E, Ceramic Disc - CD, Metalized Polystyrene - MPS.

Cct Ref, Val, Tol, Volts, Type,	Models used on,	Part No.
C005, 220n, 10%, 63V, MP	e,l,m,p	14-6835-9
C005, 1µ, 10%, 50V, MP	a,b,c,d,f,g,h,j,k,n	14-6958-4
C010, 27p, 2%, 50V, CP N150	m,p	14-6886-3
C011, 1n, 10%, 100V, CP	m,p	14-6934-7
C301, 10p, 2%, 50V, NPO CP	a,d,f,g,h,j,k,l	14-7027-2
C302, 15p, 2%, 50V, NPO CP	a,d,f,g,h,j,k,l	14-7055-8
C303, 1n, 10%, 100V, CP	a,d,f,g,h,j,k,l	14-6934-7
C304-310, 100n, 20%, 63V	a,d,f,g,h,j,k,l	14-6836-7
C411, 12p, 2%, 50V, CP	e,l,m,p	14-6862-6
⚠C414, 8n2, 5%, 2kV, MPP	e,f,g,h	14-6383-7
⚠C414, 6n8, 5%, 1.5kV, PP	b,c,d,p	14-6868-5
⚠C414, 7n5, 5%, 2kV, PP	a,j,k,l,m,n	14-6917-7
C417, 330n, 5%, 250V, MPP	a,j,k,l,m,n	14-5833-7
C417, 390n, 5%, 250V, PP	b,c,d,e,f,g,h,p	14-6506-6
C517,518, 100n, 20%, 63V, MP	m,p	14-6836-7
C519, 220n, 10%, 63V, MP	m,p	14-6834-0
C534-536, 100n, 20%, 63V, MP	a,d,e,f,g,h,j,k,l,m	14-6836-7
C540, 1n 10%, 100V, CP	a,d,e,f,g,h,j,k,l,m	14-6934-7
C541, 47n, 20%, 63V, MP	a,d,e,f,g,h,j,k,l,m	14-6879-0
C547,548, 270p, 2%, 50V, CP N750	a,d,e,f,g,h,j,k,l,m	14-6944-4
C601,602, 56p 5%, 50V, TC	m,p	14-6899-5
C603, 10n, -20+50%, 100V, CP	m,p	14-6903-7
C618, 100n, 20%, 63V, MP	a,d,e,f,g,h,j,k,l,m	14-6836-7
C620, 2n2, 10%, 100V, CP	m,p	14-6893-6
C622, 220p, 2%, 50V, CP N750	e,l,m,p	14-6943-6
C623, 10n, -20+50%, 100V, CP	a,d,e,f,g,h,j,k,l,m	14-6903-7
C703,704, 33p, 5%, 50V, CP N150	b,c,e,m,n,p	14-6887-1
C716, 100p, 5%, 50V, COH S.M.0805	e,l,m,p	72-0014-5
C717-720, 330p, 10%, 50V, TC	e,l,m,p	14-7155-4
⚠C801, 1µ, 20%, 250V AC Mains	e,l,m,p	14-6919-3
⚠C802, 220n, 20%, 250V AC Mains	l,n	14-5163-4
⚠C802, 1µ, 20%, 250V AC Mains	m,p	14-6919-3
C822,823, 1n, 20%, 250V AC, C	a,b,c,d,f,g,h,j,k,n	14-6937-1
C822,823, 10n, -20+50%, 2kV, CD	e,l,m,p	14-6954-1
CE313, 10µ, 20%, 50V, Elect	a,d,f.g.h.j.k,l	14-6849-9

Cct Ref, Val, Tol, Volts, Type,	Models used on,	Part No.
CE543, 0µ47, 20%, 50V, Elect	a,d,e,f,g,h,j,k,l,m	14-6863-4
CE516, 47µ, 20%, 50V, Elect	m,p	14-6962-2
CE604, 4µ7, 20%, 35V, Elect	m,p	14-6569-4
CE605, 10µ, 20%, 50V, Elect	m,p	14-6849-9
CE606, 2µ2, 20%, 50V, Elect	m,p	14-6845-6
CE613, 22µ, 20%, 25V, Elect	a,d,e,f,g,h,j,k,l,m	14-6850-2
CE614,621, 10µ, 20%, 50V, Elect	a,d,e,f,g,h,j,k,l,m	14-6849-9
CE619, 22µ, 20%, 25V, Elect	m,p	14-6850-2

Diodes

Cct Ref.	Description	Models used on	Part No.
D003, D601,602	BA482 Philips	m,p	19-8528-0
D301-303, D306-308	1N4148	a,d,f,g,h,j,k,l	19-3992-0
D304	BAT85 Schottky	a,d,f,g,h,j,k,l	19-8163-3
D501	BAT85 Schottky	a,d,e,f,g,h,j,k,l,m	19-8163-3
D504,708, D711-714	1N4148	a,d,e,f,g,h,j,k,l,m	19-3992-0
D703	1N4148	m,p	19-3992-0
D705	1N4148	e,l,m,p	19-3992-0
D707, D715-717	1N4148	a,d,f,g,h,j,k,l,	19-3992-0

Filters, Crystals & Delay Lines

Cct Ref.	Description	Models used on	Part No.
FL001	Filter SW OFWK2950 Siemens (LL')	m,p	15-7718-2
FL001	Filter SW (I)	a,b,c,d,f,g,h,j,k,n	15-7721-2
FL001	Filter SW (B,G)	e,l	15-7825-1
FL601	Filter SW (L sound)	m,p	15-7827-8
FL602	Filter Ceramic 6.0MHz	a,b,c,d,f,g,h,j,k,n	15-6981-3
FL602	Filter Ceramic 5.5MHz	e,l,m,p	15-7643-7
FL604	Filter 6.0MHz	a,b,c,d,f,g,h,j,k,n	15-7655-0
FL604	Trap Ceramic 5.5MHz	e,l,m,p	15-7657-7
⚠FL801	Choke Mains Filter 2.30mH 1A	a,b,c,d,f,g,h,j,k,n	15-7785-9
⚠FL801	Choke Mains Low Capacity	e,l,m,p	15-7834-0

Integrated Circuits

Cct Ref.	Description	Models used on	Part No.
IC301	SAA5244AP/A Philips	a,d,f,g,h,j,k,l,n	19-8672-4
IC501	TDA8395 Philips	m,p	19-8670-8
IC503	TDA8361 Philips	a,d,e,f,g,h,j,k,l,n	19-8668-6
IC503	TDA8360 Philips	b,c,	19-8718-6
IC503	TDA8362 Philips	m,p	19-8667-8
IC601	TDA3843 Philips	m,p	19-8669-4
IC603	4053B Toshiba	a,d,e,f,g,h,j,k,l,m,n,p	19-8124-2

Coils & Chokes

Cct Ref.	Description	Models used on	Part No.
L301	Choke 4µ7H 10%	a,d,f,g,h,j,k,l,m	15-7865-0
L302-304	Choke 2µ2H 10%	e,l,m,p	15-7800-6
L401,402	Choke 10µH 10%	e,l,m,p	15-7528-7
L404,801	Choke 4µH	e,l,m,p	85-1798-3
L504-506	Choke 3µ3H 10%	e,l,m,p	15-7751-4
L507	Choke 3µ3H 10%	a,d,e,f,g,h,j,k,l,m	15-7751-4
L601	Choke 6.8µH 10%	m,p	15-7610-0

Sockets

Cct Ref.	Description	Models used on	Part No.
SK502	21 way Euro-connector	a,d,e,f,g,h,j,k,l,m,n	22-8267-4
⚠SK901	CRT Base Skt Mini-neck	b,c,d,p	25-2075-3
⚠SK901	CRT Base Skt N-Neck	a,e,f,g,h,j,k,l,m,n	25-2079-6

Transformers

Cct Ref.	Description	Models used on	Part No.
⚠T402	Transformer FBT	b,c,d,e,f,g,h,p	15-7748-4
⚠T402	Transformer FBT	a,j,k,l,m,n	15-7839-1

Transistors

Cct Ref.	Description	Models used on	Part No.
TR001-003	Transistor RN2003	e,l,m,p	19-8552-3
TR305	NPN General Purpose	a,d,f,g,h,j,k,l	19-8145-5
TR306	PNP General Purpose	a,d,f,g,h,j,k,l	19-8146-3
TR307,405	RN1003	a,d,f,g,h,j,k,l	19-8557-4
TR502,503, TR505,605	RN1003	a,d,e,f,g,h,j,k,l,m	19-8557-4
TR504, TR602,603	NPN General Purpose	a,d,e,f,g,h,j,k,l,m	19-8145-5
TR601	NPN General Purpose	m,p	19-8146-3
TR604	RN2003	a,d,e,f,g,h,j,k,l,m	19-8552-3
TR701-703	NPN General Purpose	e,l,m,p	19-8145-5
TR705,706	RN1003	m,p	19-8557-4
TR707,708	RN1003	a,d,e,f,g,h,j,k,l,m	19-8557-4

Crystals, Filters & Delay Lines

Cct Ref.	Description	Models used on	Part No.
XL301	Xtal. 27MHz, 20pF, PR	a,d,f,g,h,j,k,l	16-1934-9
XL701	Resonator Cer. 4.0MHz	a,d,f,g,h,j,k,l	15-7632-1
XL701	Xtal. 4.0MHz, 20pF, PR	b,c,e,m,n,p	16-1881-4

Miscellaneous

Cct Ref.	Description	Models used on	Part No.
TU001	Tuner 3010 UEC 342-940	a,b,c,d,f,g,h,j,k,n	21-3681-3 or
TU001	Tuner U943C (IEC)	a,b,c,d,f,g,h,j,k,n	21-3744-5
TU001	Tuner 2000KHC 3X9 772 Telefunken	e,l,m,p	21-3745-3

Main Chassis Assemblies complete.

Chassis type		Part No.
D1	b,c	01-0895-2
D1W	d	01-0966-5
D1FV	p	01-0763-8
D2W	f,g,h	01-0757-3
D2GV	e	01-0780-8
D4W	a,j,k,n	01-0882-0
D4GW	l	01-0884-7
D4FV	m	01-0883-9

Tube Base Assemblies complete.

14" Mini-Neck	b,c,d,p	01-0761-1/I
20" Narrow Neck	e,f,g,h	01-0756-5/I
21" Narrow Neck	a,j,k,l,m,n	01-0756-5/I

C.R.T's

⚠CRT 14"	370KRB22TC05 (SPY)	b,c,d,p	18-0969-5
⚠CRT 20"	510UFB22TC05 (DPY)	e,f,g,h	18-0967-9
⚠CRT 21"	A51AEZ90X02(VW)	a,j,k,l,m,n	18-1059-6

Miscellaneous

C/Ref	Description	Models used on	Part No.
	Lead Mains 13A Plg, 5A Fuse	a,b,c,d,f,g,h,j,k,n	22-8424-3
	Lead Mains Export	e,l,m,p	22-8425-1
	Aerial Loop	b,c,d	85-4943-5
	Aerial Lead	b,c,d	85-4942-7
	Rod Antenna assembly	p	83-5702-1-001
	Back Cover	a,g,h,l,m	83-4850-2-003
	Back Cover	j,k	83-4176-1/10104
	Back Cover	e,f	83-3682-2/10103
	Back Cover	d,p	83-4568-6-002
	Back Cover	b,c	83-4568-6-003
	Back Cover	n	83-4850-2-006
	Knob On/Off	a,g,h,l,m,n	83-4469-8-001
	Knob On/Off Base	j,k	83-3229-0/10000
	Knob On/Off Cap	j	83-3827-2/30120
	Knob On/Off Cap	k	83-3827-2-001
	Knob On/Off	e,f	83-3975-9/20100
	Knob On/Off	b,d,p	83-4575-9-001
	Knob On/Off (White)	c	83-4575-9-103

For cabinet and associated parts, please contact Tatung Service Department with your CTV model and serial numbers where you will be advised accordingly.

The following parts are common to all models listed at the beginning of Section 13.

Resistors

Cct Ref.	Val.	Tol%	Watts	Type	Part No.	
R807	3K6	2	0.4	M-Film	11-5329-3	
R808	180R	2	0.4	M-Film	11-5330-7	
⚠R810.811	470K	5	0.5	M-Glaze	11-5318-8	
⚠R813,824	4M7	5	0.5	M-Glaze	11-5471-0	
⚠R819	560K	5	0.5	M-Glaze	11-5333-1	
R820	270R	1	0.25	M-F	11-5217-3	
R821	2K37	1	0.25	M-F	11-5218-1	
⚠R825	1R0	5	0.5	M-F Fusible	11-4268-2	
⚠R427,901	22R	5	0.5	M-F Fusible	11-4803-6	
⚠R605	0R22	10	0.5	M-F Fusible	11-5071-5	
⚠R622	1R0	5	0.5	Flame Ret	11-5461-3	
⚠R801	10R			Thermistor NIC	11-5674-8	
R802,803	16K	2	0.6	M-F	11-5436-2	
R812	33K	5	4.0	M-Oxide	11-5332-3	
R818	47R	10	3.0	W/Wound	11-5440-0	
⚠R822	4R7	5	0.5	M-F Fl Ret	11-5291-2	
⚠R826				Thermistor Dual Positive	11-3569-4	
⚠R904	0R33	10	0.5	M-F Fusible	11-5025-1	
R912,922, R932	100K	2	0.6		11-5266-1	
RV014	10K	25		Pot Lin PST MIN	12-3179-0	
RV407	100R	25	0.1	Pot Lin PST MIN	12-4585-6	
RV426	2K2	20		Pot Lin	12-3201-0	or
	2K	25		Pot Lin	12-4599-6	
RV537	22K	25		Pot Lin PST	12-3180-4	
RV806	2K2	20		Pot Lin	12-3201-0	
RV917,927, RV937	4K7	25		Pot Lin PST MIN	12-3178-2	

Capacitors

The majority of capacitors used are standard off-the-shelf items. Refer to the circuit diagram for values. Replacements must be of the same tolerance and rating as the originals.

Key to Type Codes:

Metalized Polyester - MP, Polypropylene - PP, Polyester - P, Metalized Polypropylene - MPP, Ceramic Plate - C, Polystyrene - PS, Electrolytic - E, Ceramic Disc - CD, Metalized Polystyrene - MPS.

Cct Ref.	Val.	Tol%	Volts	Type	Part No.	
C009	12p	2	50	C-P	14-6862-6	
C012,511, C545	2n2	10	100	C-P	14-6893-6	
C522,523, C549	1n	10	100	C-P	14-6934-7	
C402,510, C514,544	4n7	10	100	C-P	14-6894-4	
C405,420, C423	100n	10	100	M-P	14-7213-5	
C406,413, C426,609	10n	20	400	Polyester	14-6838-3	
C416,506, C512,529, C707	22n	10	250	M-P	14-6877-4	
C421	15p	2	50	C-P N150	14-6942-8	
C422,508	470p	10	100	C-P	14-6940-1	
C425, C821,824	1n	20	250	Ceramic	14-6937-1	
C501	22n	-20+80	63	C-P	14-6911-8	
C513	18p	2	50	C-P N150	14-6881-2	
C624	270p	2	50	C-P N750	14-6944-4	
C612	3n9	10	100	C-P	14-7019-1	
C616	56p	2	50	C-P N150	14-6883-9	
C709,710	22p	5	50	C-P N150	14-6885-5	
C805	4n7	10	100	C-P	14-6894-4	
C807	6n8	10	100	Polyester	14-7128-7	
C820	2n2	-20+80	63	C-P	14-6898-7	
⚠C809	1n5	5	1500	M-PP	14-6649-6	
C810	33n	10	1000	PP	14-6991-6	or
	33n	5	1000	PP	14-7231-3	
C825	100n	20	400	M-P	14-5003-4	
⚠C827	3n3	20	400AC	R12.5	14-6977-0	
C901	33n	20	250	M-PP	14-6840-5	
⚠C904	10n	-20+50	2kV	C-D	14-6954-1	
CE415	47µ	20	250DC	Low ESR	14-6992-4	
CE418	10µ	20	160	Elect	14-7044-2	
CE808	100µ	-10+30	385	Elect	14-6870-7	
CE814	47µ	20	250DC	Low ESR	14-6992-4	

Integrated Circuits

Cct Ref.	Description	Part No.	
IC001	Voltage Stabilizer 31.9-34.2	19-3443-0	
IC302	LM339N Nat Semi	19-8213-3	
IC401	TDA3653B Philips	19-8387-3	
IC502	TDA4661 Philips	19-8671-6	
IC602	LM380N Nat Semi	19-7603-6	
IC701	TFMS5360	19-8656-2	
IC702	TMP47C834N Toshiba	19-8674-0	
IC703	NMOS EEPROM 256 Byte Xicor	19-8447-0	or
	CMOS EEPROM 256 Byte	19-8513-2	
IC801	TDA4605 Siemen	19-8329-6	or
	GL8905 Goldstar	19-8706-2	
IC802	Regulator +5V 0.5A TO220 Samsung	19-8333-4	
IC803	LM317T	19-8264-8	

Transistors

Cct Ref.	Description	Part No.	
TR704	RN2003	19-8552-3	
TR004	2N4401	19-8335-0	
TR301-304,401, TR501,911,921, TR931,606	NPN General Purpose	19-8145-5	
TR402,404	BC337	19-8149-8	
TR403	S2000AF	19-8261-3	or
	BU2508AF Philips	19-8566-3	
TR802,709,710, TR711,607	RN1003	19-8557-4	
TR901	PNP General Purpose	19-8146-3	
TR801	BUK454-800A Philips	19-8359-8	
TR803	TIP31C	19-7857-8	
TR910,920,930	BF787	18-2122-9	

Diodes

Cct Ref.	Description	Part No.	
D001	BAT85 Schottky	19-8163-3	
D002,408,409, D502,503,710	1N4148	19-3992-0	
D808,813,814, D706	1N4148	19-3992-0	
D401,812	1N4003GP	19-6405-4	
D402,403,406, D807,810	BYD33G	19-8388-1	or
	BA157	19-4028-7	or
	RPG10G	19-8708-9	
ZD407	C5V6 5% 345mW V-Reg	19-4952-7	
ZD815	C9V1 5% 345mW	19-4033-3	
D801-804	BY133GP	19-8144-7	or
	BY127	19-4636-6	
D809	BYD33M	19-8393-8	or
	RGP10M	19-5135-1	
D405	BY133GP	19-8144-7	
D701	LED Red	19-8504-3	
D805	RPG15M	19-8340-7	
D811	BY396	18-2222-5	

Coils & Chokes

Cct Ref.	Description	Part No.
L003	Coil Tank	87-0112-1-002
L407	Coil Line Linear/Width	85-9792-8
L001,002	Choke 10µH 10%	15-7758-1
L701	Choke 10µH 10%	15-7528-7
L405,406	Choke 22µH	85-1118-7
L501	Choke 6.8µH 10%	15-7610-0
L503	Choke 10µH	15-7652-6
L602	Choke 6µ8H 10%	15-7732-8
L702	Choke 33µH 10%	15-7557-0

Filters, Crystals & Delay Lines

Cct Ref.	Description	Part No.
XL301	Xtal 27MHz 20pf PR	16-1934-9
XL501	Xtal 4.43361875 MHz (20pF) PR	16-1898-9
XL701	Resonator Ceramic 4.0MHz	15-7632-1

Transformers

Cct Ref.	Description	Part No.
T401	Transformer Line Drive	15-7828-6
⚠T801	Transformer SM PSU	87-0019-2-00

Miscellaneous

Cct Ref.	Description	Part No.
S701	Switch 6 Way PCB Mounting	20-4085-9
⚠FS801	Fuse Holder DE611/01	21-3712-7
⚠FS801A	Fuse Timelag 2A Ceramic	21-3685-6
⚠S801	Switch 2 Pole Push-Push Power	20-4091-3 or
	⚠ Switch Mains On/Off	20-4092-1 or
	⚠ Switch Mains On/Off SDS3P	20-4094-8
	Front Moulded 21CX5	83-4446-9-001
	Hinge RH nylon	83-3977-5/50100
	Hinge LH nylon	83-3976-7/50100
	Prism	83-4290-3
	Prism	83-4315-2
	Escutcheon 20/21CX5	83-5344-1-001
	Lens F/Text	83-4470-1-002
	Spring	83-1985-5
	Ejector Mechanism	80-0200-2
	Door CX-5	83-4472-8-001
	Clip push on	57-2863-0
	Rail Chassis Support LH	83-3688-1/10000
	Rail Chassis Support RH	83-3686-5/10000
	Coil Degaussing 21"	87-0048-6-003
	Earth Braid 21"	83-5114-7-002
	Lead Dag Earth (Molex)	83-5195-3-002
	Chassis Back Rail	83-5241-0-002
	Speaker Carrier Mono	83-4676-3-001
	Loud Speaker 6"x4" 3W 8R	21-3615-5
	Lead Loud Speaker	83-5030-2-001

Remote Control Hand Unit (FXD)

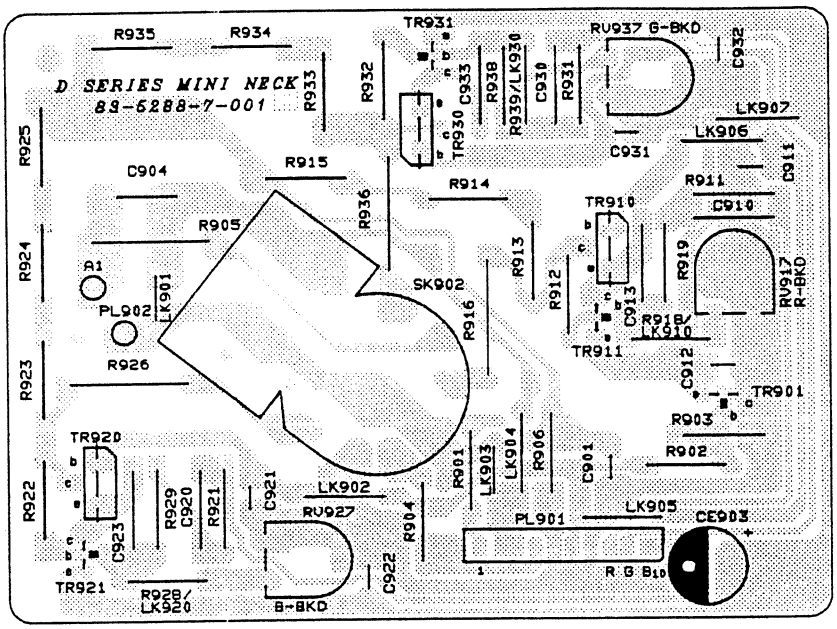
IC781	SAA3010P Philips Remote Control	19-8485-3
TR781	BC368 Remote Control	19-8283-4
D781	IR Emitter TLN115A Remote Control	19-8282-6 or
	IR Emitter Remote Control	19-8709-7
XL781	Resonator Ceramic 429KHz Remote Control	15-7720-4
	Top Cover	83-2052-7/20100
	Base Cover	83-2053-5/20100
	Battery Cover	83-2094-2/20100
	Membrane (All buttons)	83-2099-3/160100
	Escutcheon FXD R/CHU	83-3276-2-002
	PWB Transmitter R/C	83-4444-2-002
	Contact Double AAA Battery	85-4063-2
	Contact Single	83-2161-2
	Screw T/F (Plastic) 2.5x6	41-1457-4
	Complete FXD Hand Unit	01-0692-5

Note: The earlier D3W chassis 01-0702-6 is the same as the D4W with the exception of the following differences which are to be found on the D3W chassis.

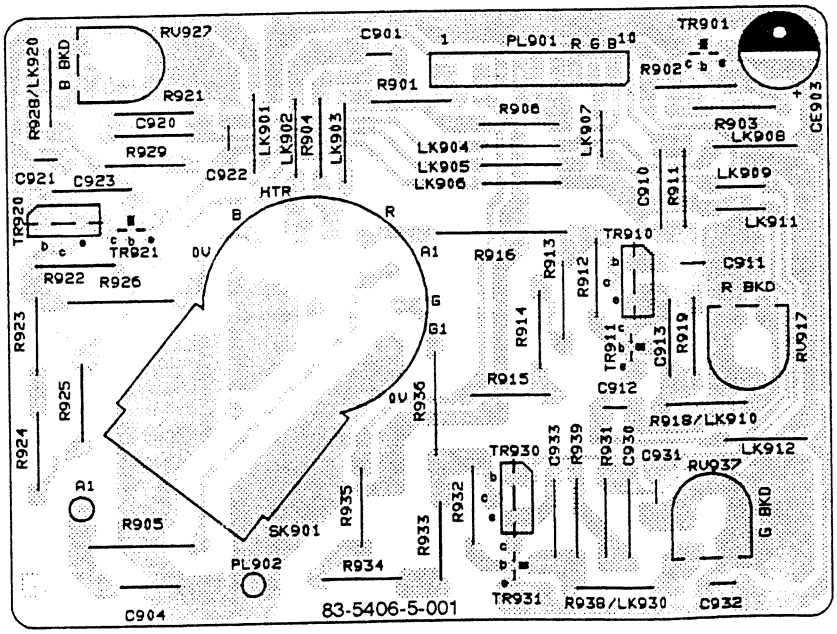
C005	470n,	10%,	63V, MP	14-6869-3
C414	5n6,	5%,	1600VDC, PP	14-7226-7
C513	18p,	2%,	50V, CP	14-7014-0
L301	Choke 4µ7			15-7865-0
Tube Base assembly				01-0683-6/H
⚠CRT Socket				25-2075-3
⚠CRT 21" Narrow Neck A51JAR90X03(VW) CPT				18-1000-6

14. PCB COMPONENT LAYOUT

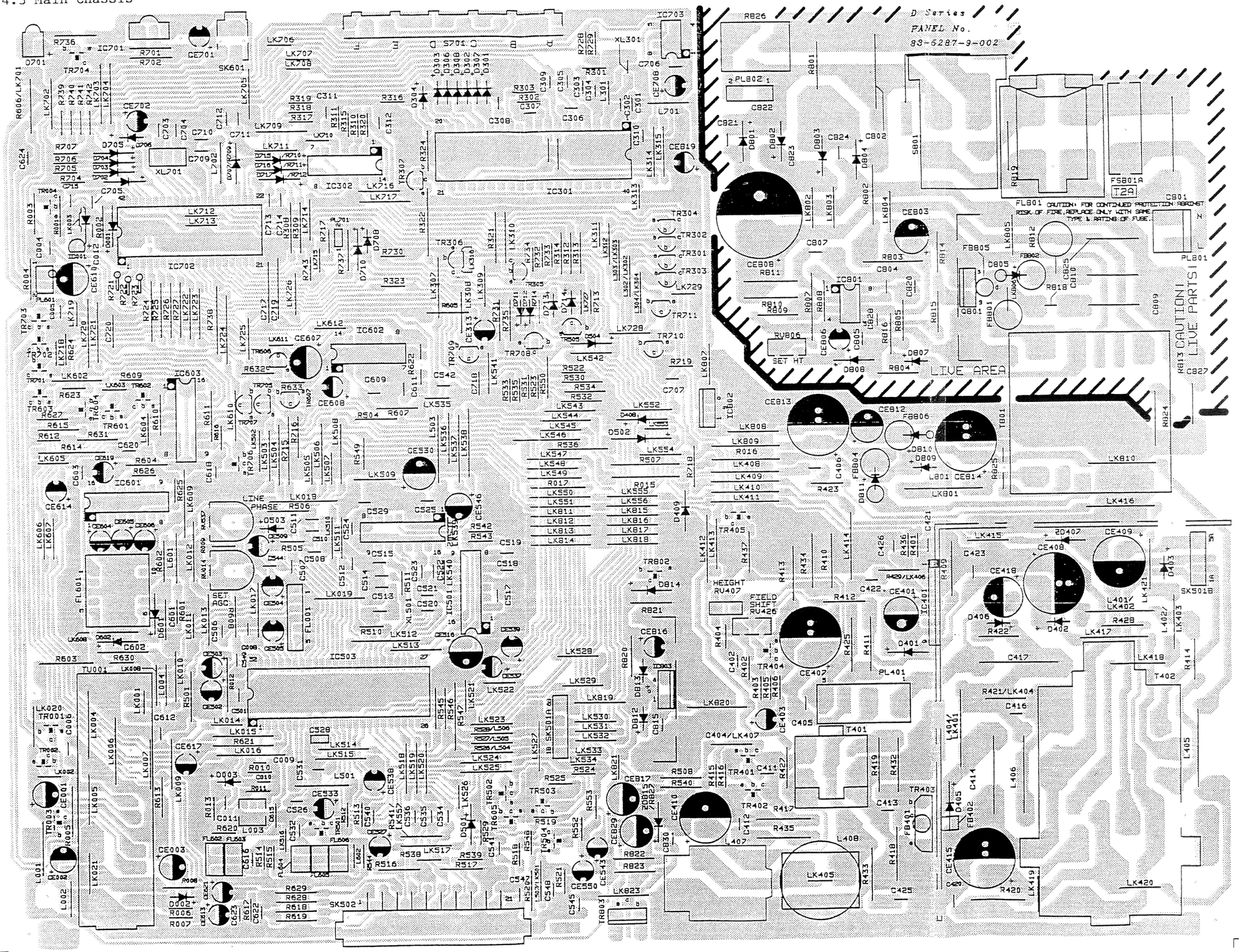
14.1 Tube Base Mini-neck



14.2 Tube Base Narrow Neck

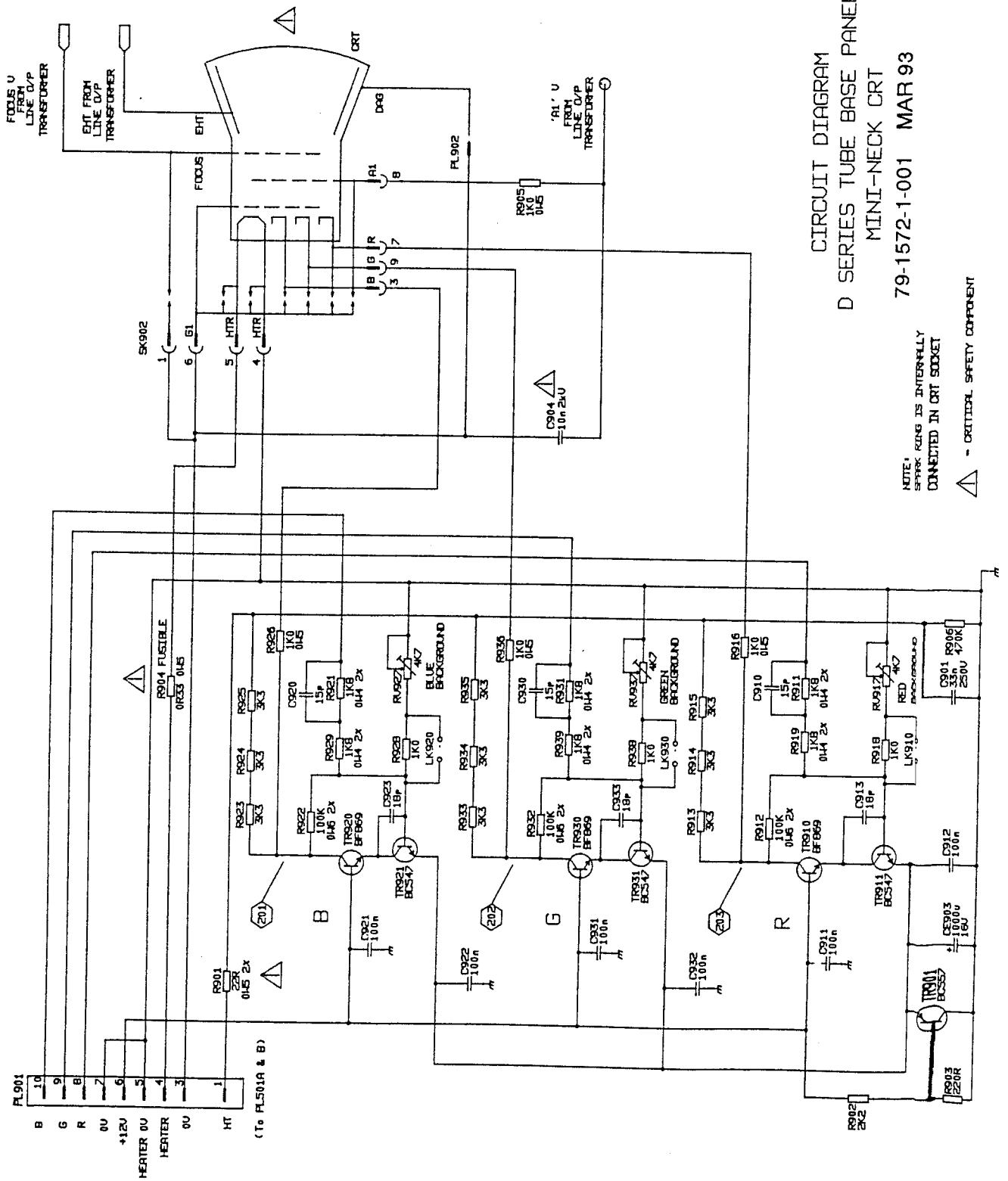


14.3 Main Chassis

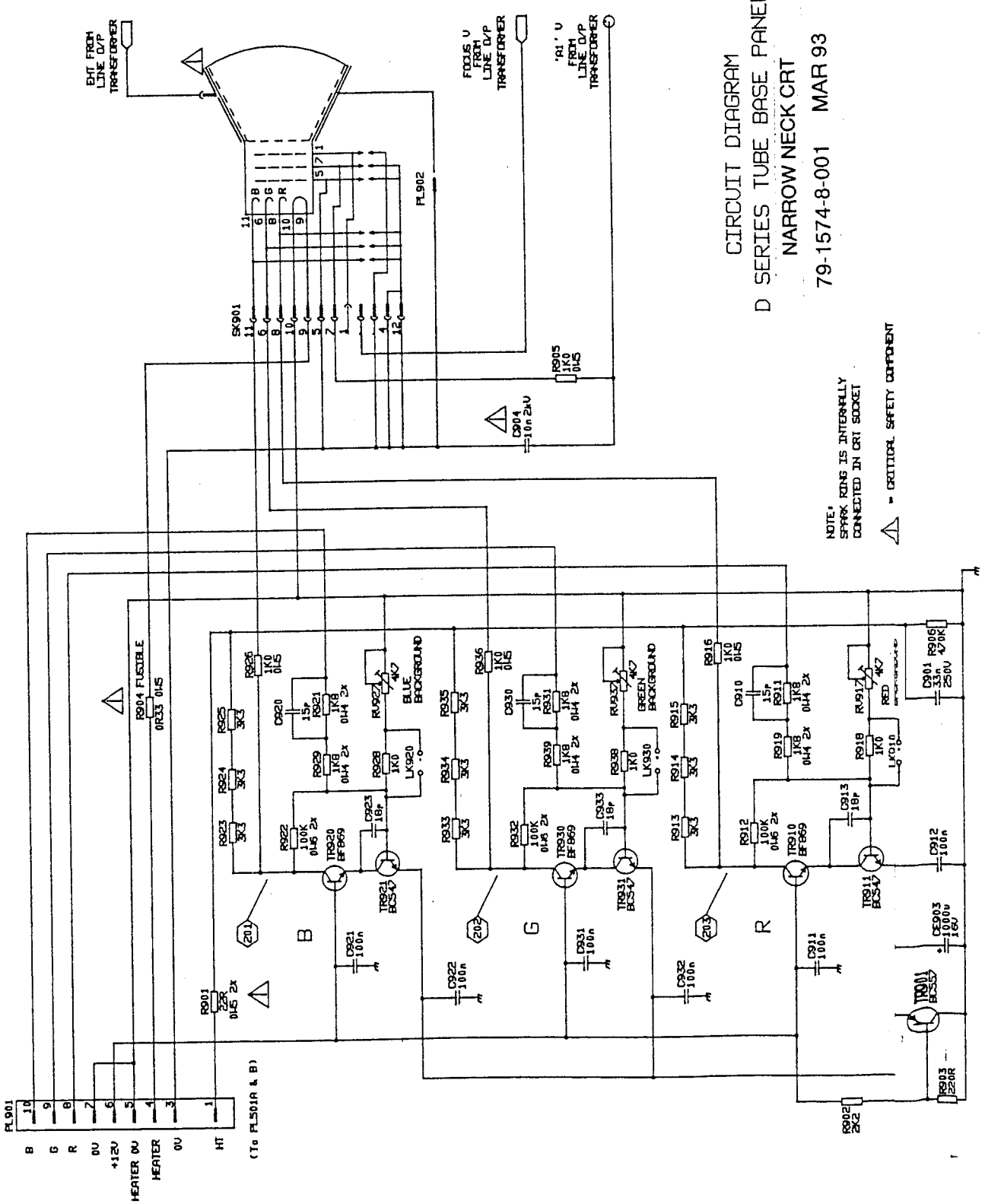


15. CIRCUIT DIAGRAMS

15.1 Tube Base Mini-neck

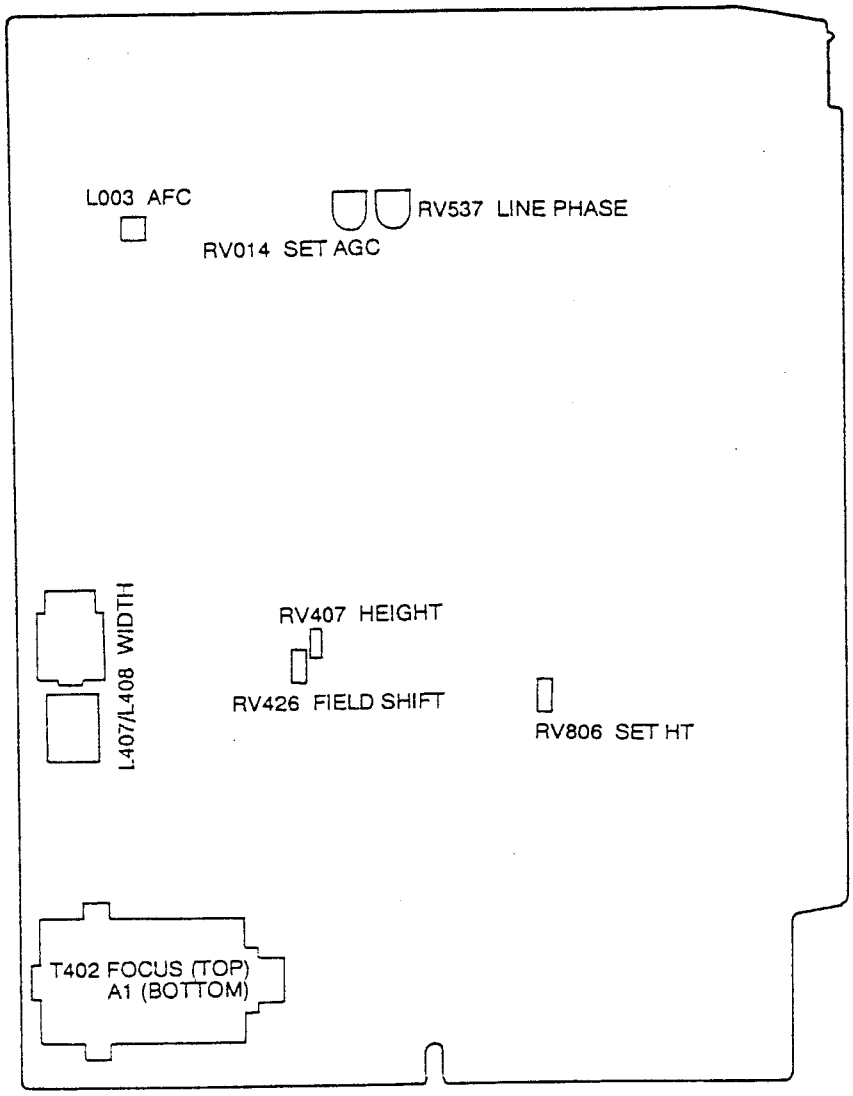


15.2 Tube Base Narrow Neck

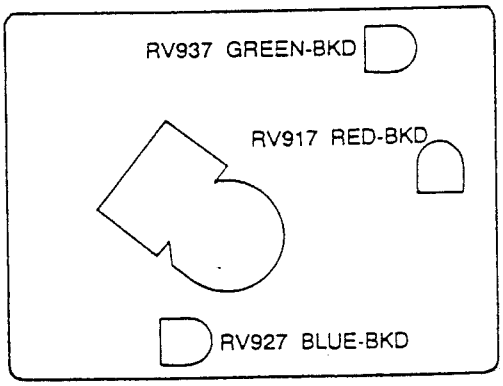


16. ADJUSTMENT LOCATIONS and ADJUSTMENTS

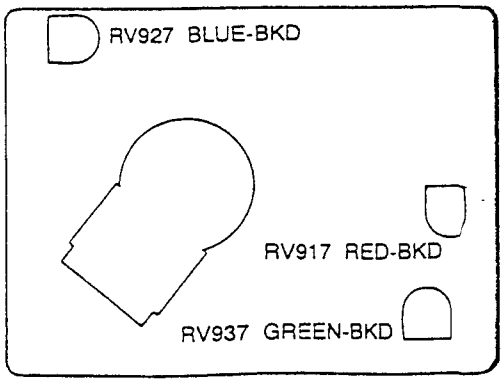
16.1 Main Chassis PCB



16.2 Tube Base Mini-neck PCB



16.3 Tube Base Narrow Neck PCB



16.3 Adjustments

HT supply (109.5V/115V)

Reduce the A1, brightness and contrast to a minimum. Adjust RV806 for 109.5V or 115V across CE415. Refer to label next to T402 for correct voltage.

A.G.C.

Correctly tune the receiver to a 10mV R.F. modulated carrier at approximately channel E 58 (767.25MHz). Monitor the tuner output (LK008) with an oscilloscope and probe calibrated to read accurately at 40MHz. Adjust RV014 to obtain the following level at the peak to peak sync excursions:-

German and French models 325mV
All other models 600mV if signal present on LK010
1.2V if no signal at LK010

A.F.C.

Adjust L003 to give 2.0V at the junction of R715 and R716 when 38.9MHz is injected into the SAW filter input (FL001 pins 1&2)

Timebase.

Width - Adjust L407/L408 (line width) and RV537 (line phase) for correct picture width and centring.
Height- Adjust RV407 (field height) and RV426 (field shift) for correct screen height and centring.

R.G.B. Background

The tube-base panel includes the supplies to the tube electrodes with their associated components for circuit protection. Internal spark gaps are fitted in the tube socket for connection to the tube external dag coating. Also included on the panel are the video amplifiers TR910 to TR931 inclusive and their adjustments. The focus and A1 supplies are encapsulated in the diode split transformer (T402).

To adjust the red, green and blue backgrounds; press the normalize button on the hand unit and then reduce the colour saturation to minimum.
Adjust each of the background controls RV917,RV927,RV937 so that the black level measured at each tube cathode (R916,R926,R936) is 160V.

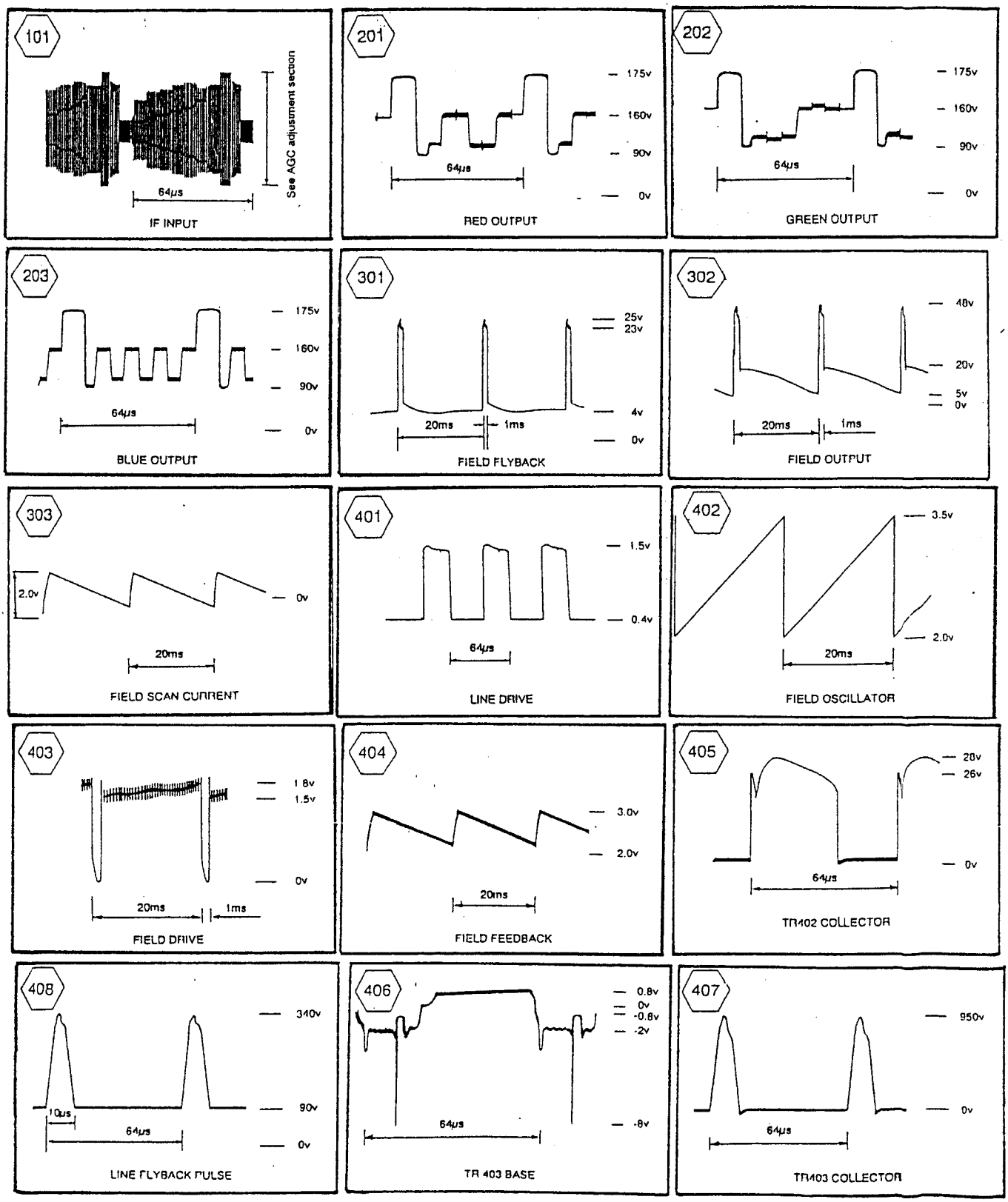
A1 Control.

Adjust the A1 control (lower adjustment on T402) for correct overall black level on the display. Grey-scale adjustments may now be carried out with only two of the background preset controls.

Focus.

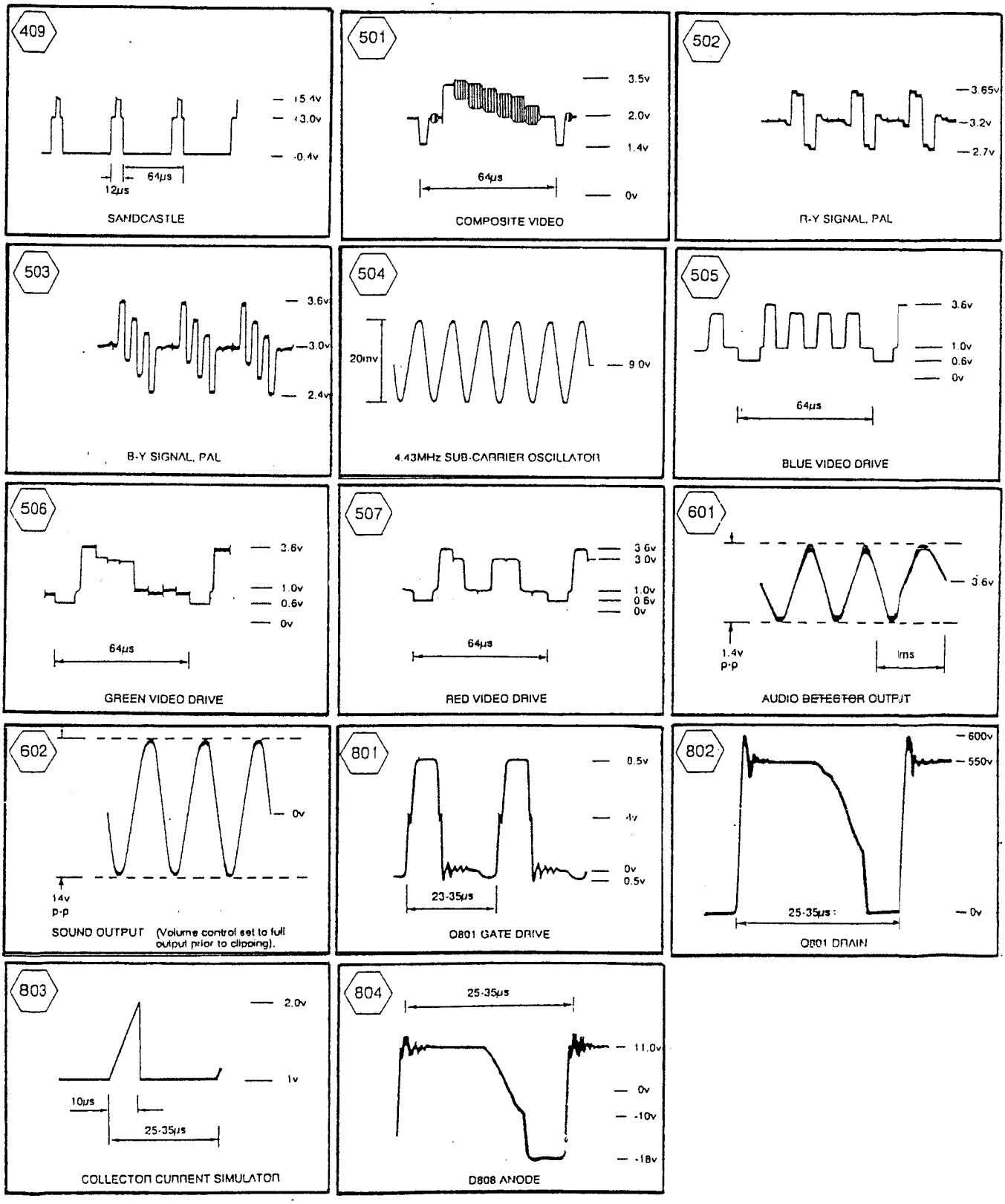
Adjust the upper control on T402 for optimum focus in the centre of the screen.

17. WAVEFORMS



Waveforms

continuation:



TUNER
LOCAL CONTROLS
INFRA-RED RECEIVER
IC701 TFMS5360
MICROCONTROLLER
IC702 TMP47C834N
TMP47C634N
NV RAM
IC703 X2402P
TEST POINT
TEXT/OSD DRIVER
IC302 LM339N
IC301 SAA5244AP/A
SAA5254AP
TELETEXT
AM SOUND IF
FL601 OFWL4450 SAW FILTER
IC601 TDA3843
SET AGC
SECAM DECODER
IC501 TDA8395
IC502 TDA4661
BASEBAND DELAY LINE
LINE PHASE
12V REGULATOR
8V REGULATOR
MAINS ISOLATION BARRIER
POWER SUPPLY
IC801 TDA4605
TO DEGAUSS COIL
AC SUPPLY INPUT
PIN 4 IC801 -340V RELATIVE TO CHASSIS 0V. -340V

MICROCONTROLLER

IC702 TMP47C834N

TMP47C634N

AM SOUND IF

FL601 OFWL4450 SAW FILTER

IC601 TDA3843

AUDIO AMP

IC602 LM380N

HEADPHONE SOCKET

SPEAKER

IF/DECODER /DEFLECTION

IC503 TDA8362

TDA8361

SECAM DECODER

IC501 TDA8395

IC502 TDA4661

BASEBAND DELAY LINE

NV RAM

IC703 X2402P

TEXT/OSD DRIVER

12V REGULATOR

8V REGULATOR

5V REGULATOR

IC803 LM317T

IC802 L78M05CV

IC801 TDA4605

MAINS ISOLATION BARRIER

POWER SUPPLY

LINE DRIVE

T401

TO DEGAUSS COIL

AC SUPPLY INPUT

TEST POINT

SET AGC

SET HT

LINE PHASE

PIN 4 IC801 -340V RELATIVE TO CHASSIS 0V. -340V

FIELD OUTP

LINE OUTP

AUDIO AMP
HEADPHONE SOCKET
SIGNAL SWITCHING
IC602 LM380N
IC603 TC4053BP
IF/DECODER /DEFLECTION
IC503 TDA8362
TDA8361
SET AGC
LINE PHASE
SPEAKER
8R 3W
FIELD OUTPUT AMP
IC401 TDA3653B
8V REGULATOR
5V REGULATOR
LINE DRIVE
LINE OUTPUT
TO SCAN COILS
T401
T402
LINE OUTPUT TRANSFORMER
EHT
FOCUS
A1
TUBE 0V 1
HEATER
FIELD SHIFT
HEIGHT
BRI
SAT
CON
VOL
CABLE HARNESS TO PL901 ON TUBE BASE PANEL
(BACK RAIL RF EARTH)

SAFETY AND ISOLATION.

THE POWER SUPPLY IS ALWAYS LIVE REGARDLESS OF THE MAINS SUPPLY POLARITY. THEREFORE, FOR SERVICING, THE RECEIVER SHOULD BE SUPPLIED THROUGH A MAINS ISOLATION TRANSFORMER.

THE POWER SUPPLY REMAINS CHARGED FOR ABOUT 30 SECS AFTER SWITCHING OFF. AVOID TOUCHING THIS AREA DURING THIS TIME.

MOST OF THE RECEIVER, OTHER THAN THE POWER SUPPLY, IS ISOLATED FROM THE MAINS BY T801,R813,R824,C827,AND AN AIR GAP OF 6MM OR MORE. TO MAINTAIN SAFETY, ENSURE THAT AFTER REPAIR THE AIR GAPS ARE NOT REDUCED BY PROTRUDING WIRES ETC.

COMPONENTS MARKED ⚠ ON THE PARTS LIST OR CIRCUIT DIAGRAM ARE SAFETY APPROVED TYPES AND SHOULD BE REPLACED ONLY WITH COMPONENTS SUPPLIED, OR APPROVED BY, OUR SERVICE DEPARTMENT. IT IS RECOMMENDED THAT OTHER REPLACED PARTS SHOULD BE OF THE TYPE ORIGINALLY FITTED, PARTICULARLY RESISTORS STOOD OFF THE PRINTED BOARD.

FAILURE TO OBSERVE THE ABOVE MAY RENDER THE CHASSIS AND EXTERNAL ACCESSIBLE PARTS LIVE, OR CAUSE OTHER HAZARDS.

✳ - MAY NOT BE FITTED.
⊕ - VARIES BETWEEN MODELS.
Ⓜ - FITTED ON VHF/UHF VERSIONS.
Ⓝ - FITTED ON NON VHF VERSIONS.
Ⓒ - FITTED ON SECAM VERSIONS.
Ⓝ - FITTED ON NON SECAM VERSIONS.
Ⓕ - FITTED ON FRENCH MODELS.
Ⓝ - FITTED ON NON FRENCH MODELS.
Ⓣ - FITTED ON TELETEXT VERSIONS.
Ⓝ - FITTED ON NON TELETEXT VERSIONS.

CIRCUIT DIAGRAM
D SERIES MAIN PANEL